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Paper Title	**An Efficient and Easy-to-Maintain UPS employing Electric Double Layer Capacitor and Emergency Generator**
Authors	*Suresh Chand Verma* Chubu Electric Power Company, Inc., Japan *Shigeyuki Sugimoto* Chubu Electric Power Company, Inc., Japan *Nobuyuki Yamamoto* Chubu Electric Power Company, Inc., Japan *Kazuhiro Okada* Shizuki Electric Company, Inc., Japan *Hisahiro Yabe* Shizuki Electric Company, Inc., Japan
Correspondence Address	***S. C. Verma*** Electric Power R&D Center, Chubu Electric Power Co., Inc. 20-1, Kitasekiyama, Odaka-cho, Midori-ku, Nagoya 459-8522, JAPAN *Tel. + 81-50-7772-2778, Fax. +81-52-623-5117* *E-mail: Sc.Verma@chuden.co.jp*

ABSTRACT

For the rapidly emerging high-tech industries in today's information age, there is a growing need to maintain the continuity of electric power supply not only during power interruptions, but also during the small momentary voltage dips even for a fraction of second. Presently, such needs are usually met with a lead-acid storage battery based Uninterrupted Power Supply (UPS) system that requires periodical maintenance and replacement of such batteries. Moreover, these batteries are not environment friendly as well as the scope to improve their charging/discharging efficiency further is quite limited. On the other hand, in comparison to the lead-acid storage battery, the recently developed Electric Double Layer Capacitor (EDLC) has various advantageous features like, a fast and efficient charging/discharging ability, long charging/discharging life cycle, nearly no maintenance, and usage of environment friendly material.

Hence, in this paper, an efficient and easy-to-maintain UPS by using EDLC in place of the conventional batteries is proposed. The energy stored in the EDLC is mainly used to maintain the continuity of the supply during the short-term interruptions including momentary voltage dips. The proposed UPS also uses an Emergency Generator (EG) to keep the continuity of the supply for the frequent and long-term interruptions likely to happen with a relatively less reliable system. Under normal conditions of no interruptions or no momentary voltage dips, the UPS allows the local supply to feed the sensitive loads and keeps itself fully charged for any eventuality later on. However, in the event of any abnormal conditions, the UPS can sense, isolate the faulty system and start feeding the loads within a time span of 2 ms and continue the supply till the EG gets started, synchronized and starts supplying the loads fully. On restoration of the local supply, the proposed UPS helps the loads to be transferred from the EG to the local supply virtually un-interrupted.

In order to assess the overall functioning of the proposed system, in this research work, a suitable circuit diagram of the proposed UPS along with an appropriate control scheme to switch over from EDLC to EG and so on, are devised and are tested for their performance through simulation studies. Based on these simulation results, the proper functioning, viability and realization of the proposed UPS system employing EDLC and EG, are confirmed. In future, we plan to perform some experimental studies to confirm the technical, economical as well as reliability aspects of the proposed UPS.